

Caught malaria in the act.

A never-before seen view of the malaria parasite inside a red blood cell was obtained at Berkeley Lab's Advanced Light Source. The images led to a better understanding of how malaria changes red blood cells and may help scientists improve drugs that fight the deadly disease.



Helped bring energy efficiency to China.

Since 1988, Lab scientists have worked to make the world's second largest energy consumer after the U.S. as energy efficient as possible. Energy labels and appliance standards, developed with considerable support from Berkeley Lab, will reduce carbon emissions in China by about 9.1 billion tons between 2009 and 2030. The Lab has also helped improve energy efficiency in China's residential and commercial buildings, and in industries such as cement manufacturing.



Pioneered medical imaging.

In the 1950s, Berkeley Lab's Hal Anger developed a scintillation camera that enabled physicians to detect tumors by imaging gamma rays emitted by radioactive isotopes. The camera that bears his name evolved into modern imaging systems, such as PET, which enable doctors to detect many diseases early enough to save patients' lives.



Brought the stars closer.

Scientists can glimpse supernovae billions of light years away thanks to revolutionary telescope technology developed at Berkeley Lab in the late 1970s. The segmented mirror design is used at many observatories worldwide, including the giant twin telescopes of the Keck Observatory on the summit of Mauna Kea in Hawaii, which are the most powerful ground-based telescopes in the world.



Berkeley Lab Breakthroughs that Improved the World — and Our Lives

Since 1931, Lawrence Berkeley National Laboratory, a U.S. Department of Energy laboratory managed by the University of California, has convened teams of scientists to tackle the most urgent challenges of the day. Their work has saved lives, generated jobs, reduced energy costs by billions and sparked the imagination of several generations. That same commitment to new technologies for a changing world continues today.

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Lawrence Berkeley National Laboratory
Managed by the University of California for the Department of Energy

At Berkeley Lab, we've:

Discovered sixteen elements.

The periodic table would be smaller without Berkeley Lab. Among the Lab's handiwork is an instrumental role in the discovery of technetium-99, which has revolutionized the field of medical imaging. There's also americium, which is widely used in smoke detectors.



Turned windows into energy savers.

Americans save billions of dollars in energy bills each year thanks to a Lab-developed window coating that prevents heat from entering in the summer and escaping in the winter. More than half of all windows sold each year have this coating.

Unmasked a dinosaur killer.

Natural history's greatest whodunit was solved in 1980 when a team of scientists led by Berkeley Lab's Walter Alvarez pinned the dinosaurs' abrupt extinction on an asteroid collision with Earth. Case closed.



Explained photosynthesis.

Ever wonder how plants turn sunlight into energy? Berkeley Lab's Melvin Calvin determined the path of carbon through photosynthesis, a scientific milestone that illuminated one of life's most important processes. Today, this work allows scientists to explore how to derive sustainable energy sources from the sun.

Created the toughest ceramic.

Lab scientists mimicked the structure of mollusk shells to create what may well be the toughest ceramic ever produced. The material could lead to incredibly strong yet light composites that are perfect for energy and transportation applications.

Pitted cool roofs against global warming.

The Lab leads the way in analyzing and implementing cool roofing materials, which reflect sunlight, lower surface temperature, and slash cooling costs. Think globally: If all the world's roofs and pavement used cool materials, the reduction in carbon dioxide emissions would be equivalent to taking the world's 600 million cars off the road for 18 years.

Exposed the radon risk.

You can sleep easier thanks to Lab research that quantified the health risk posed by radon gas in parts of the country. Subsequent EPA standards, coupled with radon detection and mitigation measures pioneered by the Lab, prevent the naturally occurring gas from seeping into basements, saving thousands of lives every year.

Given fluorescent lights their big break.

Chances are you're reading this using energy-efficient fluorescent lighting, and chances are those lights use electronic ballasts, which control the current flowing through the light. Berkeley Lab developed the ballast in the 1970s with the lighting industry. A 2001 study found that electronic ballasts sold through 2005 would provide \$15 billion in energy savings.

Built a better battery.

A new family of long-lasting rechargeable batteries was made possible when Lab scientists invented a novel class of solid polymer cathodes. Now, Lab scientists are developing long-life, safe batteries for plug-in hybrid vehicles.

Preserved the sounds of yesteryear.



Lab scientists engineered a high-tech way to digitally reconstruct aging sound recordings that are too fragile to play, such as Edison wax cylinders from the late 1800s. Archivists estimate that many of the millions of recordings in the world's sound archives, including the U.S. Library of Congress, could benefit from the technology.

Fabricated the smallest machines.

The world's smallest synthetic motor — as well as radios, scales, and switches that are 100,000 times finer than a human hair — were engineered at Berkeley Lab. These and other groundbreaking forays into nanotechnology could lead to life-saving pharmaceuticals and more powerful computers.

Made appliances pull their weight.

U.S. consumers save \$7 billion each year thanks to Lab scientists who helped to develop the federal government's energy efficiency standards for appliances. And those Energy Star labels you see on appliances? The Lab helped to implement those too.

Brought safe drinking water to thousands.

More than half a million people drink clean water thanks to a fast and cheap purifier developed at Berkeley Lab. The device, called UV Waterworks, uses ultraviolet light to kill water-borne diseases such as dysentery, which is a major cause of child mortality in the developing world.

Created a pocket-sized DNA sampler.

A tool that identifies the microbes in air, water, and soil samples is fast becoming a workhorse in public health, medical, and environmental cleanup projects. Only a few years old, the credit-card sized PhyloChip is already pinpointing the diseases that kill coral reefs, and cataloging airborne bacteria over U.S. cities.



Revealed the secrets of the human genome.

Berkeley Lab, no stranger to big science, played a key role in the landmark Human Genome Project. The Walnut Creek-based Joint Genome Institute, managed in part by Berkeley Lab, sequenced human chromosomes 5, 16, and 19, which are regions of the genetic library implicated in diabetes, atherosclerosis, asthma, and other diseases.

Redefined the causes of breast cancer.

A new path in cancer treatment research was forged thanks to a revolutionary theory developed at Berkeley Lab that links breast cancer to a breakdown in the micro-environment surrounding breast cells.

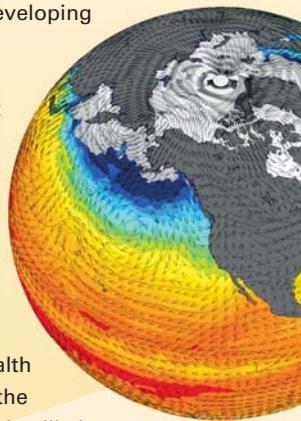


Given buildings an energy makeover.

The Lab wrote the book, or program rather, when it comes to wringing every penny out of a building's energy use. Software developed at Berkeley Lab is used worldwide to audit a structure's energy consumption. If you've set foot in the San Francisco Airport, Sears Tower, or the Nestle Headquarters in Switzerland, you've experienced energy savings thanks to Berkeley Lab.

Supercharged the climate model.

Climate simulations conducted at the Lab's National Energy Research Scientific Computing Center helped to make global warming a dinner table conversation. Lab scientists are now developing a more powerful model that forecasts climate change's impact on ecosystems and human health around the world. It will also predict how well carbon-cutting strategies curb global warming.



Derailed an ecological danger.

In the 1980s, Lab scientists linked the poisoning of birds at a reservoir in California's San Joaquin Valley to selenium contamination from agricultural runoff. Their work exposed a looming national problem and sparked environmental agencies to take action.

Berkeley Lab: Bringing Science Solutions to the World